

## **REMARKS**

### **Remarks Regarding Claim Amendments**

Claims 30, 31, 34-46, 48-61 and 63-66 are currently pending in the instant application of which claims 30 and 31 are independent. Claims 39-44 and 54-59 have been withdrawn. Claims 1-29, 32, 33, 35-37, 47, 50-52 and 62 have been canceled.

Claim 30 has been amended to incorporate the limitations of claim 37, *i.e.*, that the polymer is a hydrogel. Claim 31 has been amended to incorporate the limitations of claim 52, *i.e.*, that the membranes comprise a biopolymer hydrogel. Claims 38, 53 and 64 have been amended to change their dependency. Claim 64 has also been amended to place it in better form.

Upon entry of these amendments, claims 30, 31, 34, 38-46, 48, 49 53-61 and 63-66 will be pending in the instant application. These amendments are fully supported and justified by the application as originally filed. No new matter has been added by these amendments and their entry is respectfully requested. Applicants reserve the right to pursue the subject matter of the unamended claims in one or more related applications.

### **Remarks regarding 35 U.S.C. § 102**

1. Claims 30, 31, 34-36, 45, 46, 48, 49, 65 and 66 stand rejected under 35 U.S.C. § 102(e) as allegedly anticipated by Weiss *et al.* (U.S. 6,143,293, "Weiss"). Applicants respectfully traverse.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987), *cert. denied*, 484 U.S. 827 (1987). Conversely, if each and every element in a claim is not found in a single prior art reference, there can be no anticipation.

Weiss describes three dimensional scaffolds for tissue generation (*See, e.g.*, Abstract and col. 6, lines 2-5). The three dimensional scaffolds are generated "using mechanical fasteners, such as screws, sutures and microbarbs" to assemble sections or layers of scaffold material (col. 6, lines 2-5). Weiss exemplifies these three dimensional scaffolds using hydroxyapatite subsections 1 mm thick and 10 mm in diameter that were sewn together with nylon sutures (col. 11, line 41 - col. 12, line 24).

Independent claim 30 has been amended, *inter alia*, to incorporate the limitations of

claim 37 (*i.e.*, that the polymer is a hydrogel), which the Office Action does not allege to be anticipated by Weiss. Because claim 30 incorporates the features of claim 37, claim 30 cannot be anticipated by Weiss either. Claims that depend on claim 30 incorporate the recitations of claim 30, and cannot be anticipated by Weiss for the same reason. *See also* Applicants' remarks in this Response below regarding why this feature is not obvious from Weiss in view of Ma.

Independent claim 31 has been amended, *inter alia*, to incorporate the limitations of claim 52 (*i.e.*, that the membranes comprise a biopolymer hydrogel), which the Office Action does not allege to be anticipated by Weiss. Because claim 31 incorporates the features of claim 52, claim 31 cannot be anticipated by Weiss either. Claims that depend on claim 31 incorporate the recitations of claim 31, and cannot be anticipated by Weiss for the same reason. *See also* Applicants' remarks in this Response below regarding why this feature is not obvious from Weiss in view of Ma.

For the reasons stated above, Applicants assert that the pending claims are not anticipated by Weiss and respectfully request the withdrawal of this rejection.

**Remarks regarding 35 U.S.C. § 103**

2. Claims 37, 38, 50-53 and 64 stand rejected under 35 U.S.C. § 103(a) as allegedly obvious over Weiss in view of Ma (U.S. 6,872,387, "Ma"). Applicants respectfully traverse.

Ma describes, *inter alia*, the use of ionically crosslinked alginate gels as scaffolds for in vitro tissue engineering applications (*See, e.g.*, col. 2, lines 21-24 and col. 5, lines 50-54). The hydrogel scaffolds of Ma have dimensions of millimeters and not microns (*See, e.g.*, col. 3, lines 10-16 and 53-55 and col. 6, lines 7-53).

Claims 37 and 50-52 have been cancelled, therefore the rejection of these claims is moot.

Independent claims 30 and 31 have been amended to incorporate the recitations of claims 37 and 52, respectively.

Amended independent claims 30 and 31, as well as their corresponding dependent claims, are directed to, *inter alia*, a microfabricated polymer scaffold comprising two or more hydrogel membranes that contain 10 to 100 micron features. The Office Action alleges that one of ordinary skill in the art would have been motivated to modify Weiss to incorporate the hydrogel polymer scaffolds of Ma to arrive at the inventions of the pending claims.

Applicants respectfully submit that Weiss and Ma do not, individually or in combination,

teach or suggest the inventions defined by Applicants' amended independent claims 30 or 31. Applicants respectfully submit that, at the time of Applicants' invention, a person having ordinary skill in the relevant art would not have modified Weiss in view of Ma. At the time the invention was made, a person having ordinary skill in the relevant art would not have thought it feasible to layer or fuse thin hydrogel membranes that contain 10 to 100 micron features. Thin hydrogels with 10 to 100 micron features are weak and difficult to manipulate and layer, and as a result, it would not have been considered feasible, and hence it would have been unsuitable, to layer or fuse thin hydrogel membranes. Therefore, a person having ordinary skill in the relevant art would not have modified Weiss in view of Ma. See *Environmental Designs, Ltd. v. Union Oil Co. of California*, 713 F.2d 693, 697 (Fed. Cir. 1983) ("highly probative evidence of nonobviousness resides in the expressions of disbelief by ... experts ...."); *Ortho-McNeil Pharmaceutical, Inc. v. Mylan Laboratories, Inc.*, 520 F.3d 1358, 1365 (Fed. Cir. 2008) ("The record ... shows skepticism of experts .... As this court has repeatedly explained, this evidence is not just a cumulative or confirmatory part of the obviousness calculus but constitutes independent evidence of nonobviousness."); *Metabolite Laboratories, Inc. v. Laboratory Corporation of America Holdings*, 370 F.3d 1354, 1368 (Fed. Cir. 2004) (affirming nonobviousness determination where "[t]he record, for example, shows that skilled artisans were initially skeptical about the invention."); *Vulcan Engineering Co., Inc. v. Fata Aluminum, Inc.*, 278 F.3d 1366, 1373 (Fed. Cir. 2002) (affirming nonobviousness where the "record shows ... articles in trade journals and testimony of witnesses concerning the belief in the engineering community that the [invention] ... could not be effectively mechanized"); *In re Dow Chemical Co.*, 837 F.2d 469, 473 (Fed. Cir. 1988) ("The skepticism of an expert, expressed before these inventors proved him wrong, is entitled to fair evidentiary weight."); *Burlington Industries, Inc. v. Quigg*, 822 F.2d 1581, 1582 (Fed. Cir. 1987) (affirming nonobviousness determination based on "persuasive, unrebutted evidence of the initial incredulity and skepticism by experts and others in the field").

Despite the Office Action's contention that it would have been obvious to have modified the polymer scaffold of Weiss in view of Ma "in order to provide a scaffold of ... hydrogel polymers" (Office Action, p. 4), it was Applicants' specification, and *not* the cited references, which recognized the advantages and suitability of making and using a microfabricated polymer

scaffold comprising two or more hydrogel membranes that contain 10 to 100 micron features. The three dimensional layered scaffold of Weiss is exemplified by hydroxyapatite subsections 1 mm thick and 10 mm in diameter that were sewn together with nylon sutures (col. 11, line 41 - col. 12, line 24). Similarly, the hydrogel scaffolds of Ma have dimensions of millimeters and not microns (*See, e.g.*, col. 3, lines 10-16 and 53-55 and col. 6, lines 7-53). Applicants respectfully submit that maintenance of the obviousness rejection would necessarily entail hindsight reconstruction, impermissibly using Applicants' own specification as a blueprint to piece together the prior art. *See KSR v. Teleflex*, 127 S.Ct. 1727, 1742 (2007) ("A factfinder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning.").

For at least the reasons stated above, Applicants respectfully assert that independent claims 30 and 31, as well as their corresponding dependent claims, are not obvious over Weiss in view of Ma. Applicants therefore respectfully request the withdrawal of this rejection.

3. Claims 60, 61 and 63 stand rejected under 35 U.S.C. § 103(a) as allegedly obvious over Weiss in view of Masini. Applicants respectfully traverse.

Masini describes, *inter alia*, a system and methods for mechanical loading of a tissue engineered scaffold in culture (*See, e.g.*, Abstract and ¶¶ [0010] - [0012]).

Claims 60, 61 and 63 depend on claim 31 which has been amended, *inter alia*, to incorporate the limitations of claim 52 (*i.e.*, that the membranes comprise a biopolymer hydrogel), and this feature of claim 52 is incorporated into claims 60, 61 and 63 by nature of their dependency on claim 31. The Office Action does not allege that Weiss teaches or suggests that the membranes comprise a biopolymer hydrogel. Masini also does not teach or suggest that the membranes comprise a biopolymer hydrogel. *See* July 15, 2008 Non-Final Office Action, pgs. 3-5. As neither Weiss or Masini teaches or suggests that the membranes comprise a biopolymer hydrogel, they cannot render claims 60, 61 and 63 obvious. *See also* Applicants' remarks in this Response above regarding why this feature is not obvious in view of Ma.

For at least the reasons stated above, Applicants respectfully assert that the pending claims, including claims 60, 61 and 63, are not obvious over Weiss in view of Masini. Applicants therefore respectfully request the withdrawal of this rejection.

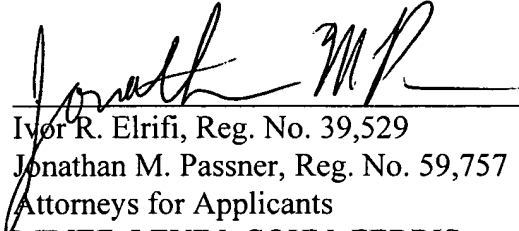
**CONCLUSION**

Favorable action on the merits is respectfully requested. If there are any questions regarding this Response, the Examiner is encouraged to contact the undersigned at the telephone number provided below to expedite further processing of the application.

Applicant believes no additional fees are due with the filing of this Response. However, if any additional fees are required or if any funds are due, the USPTO is authorized to charge or credit Deposit Account Number: **50-0311**, Customer Number: **35437**, Reference No.: **36796-502C01US**.

Respectfully submitted,

Date: November 9, 2009

  
Ivor R. Elrifi, Reg. No. 39,529  
Jonathan M. Passner, Reg. No. 59,757  
Attorneys for Applicants  
MINTZ, LEVIN, COHN, FERRIS,  
GLOVSKY and POPEO, P.C.  
666 Third Avenue, 24<sup>th</sup> Floor  
New York, NY 10017  
Telephone: (212) 935-3000  
Telefax: (212) 983-3115